ARTESYN PTH12050

12 Vin Single Output



Advanced Energy's Artesyn PTH12050 series of non-isolated DC-DC converters complies with the Point-of-Load Alliance (POLA) standard. The converters offer some of the most advanced POL functions in the industry, including Auto-Track™ sequencing for controlled power-up/power-down of complex semiconductor devices such as DSPs, FPGAs and ASICs. Standard features include pre-bias startup, input undervoltage lockout, remote On/Off and auto resetting short-circuit protection.

There are two models in the PTH12050 series of converters, both of which have an input voltage range of 10.8 to 13.2 Vdc. One model offers an output voltage that can be trimmed from 0.8 to 1.8 Vdc, the other has an output that can be trimmed from 1.2 to 5.5 Vdc, enabling a broad diversity of semiconductor power needs to be satisfied. Rated at 33 watts, the converters offer up to 93% efficiency and can deliver up to 6 amps. Available in through-hole horizontal mount and surface-mount versions, they have a small 0.5 x 0.87 inch (12.7 x 22.1 mm) footprint and an installed height of just 0.33 inch (8.5 mm).

DATA SHEET

Total Power:

33 Watts

# of Outputs:

Single

RoHS 6/6 COMPLIANT

*Auto-track is a trademark of Texas Instruments.

SPECIAL FEATURES

- 6 A output current
- 12 V input voltage
- Wide-output voltage adjust:
  1.2 - 5.5 Vdc for suffix 'W'
  0.8 - 1.8 Vdc for suffix 'L'
- Auto-track™ sequencing*
- Pre-bias start-up
- Efficiencies up to 93%
- Output ON/OFF inhibit
- Output voltage sense
- Point-of-Load-Alliance (POLA) compatible
- RoHS compliant
- Two year warranty

SAFETY

- UL/cUL CAN/CSA-C22.2 No. 60950-1-03/UL 60950-1, File No. E174104
- TÜV Product Service (EN60950) Certificate No B 04 06 38572 044
- CB Report and Certificate to IEC60950, Certificate No. US/8292/UL

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ELECTRICAL SPECIFICATIONS

Input		
Input voltage range	(See Note 3)	10.8 - 13.2 Vdc
Input current	No load	10 mA typical
Remote ON/OFF	(See Note 1)	Positive logic
Start-up time		1 V/ms
Undervoltage lockout		8.8 - 10.4 V typical
Track input voltage	Pin 8 (See Notes 6)	±0.3 Vin
Output		
Voltage adjustability	(See Note 4)	1.2 - 5.5 Vdc (Suffix 'W') 0.8 - 1.8 Vdc (Suffix 'L')
Setpoint accuracy		±2.0% Vo
Line regulation		±5 mV typical
Load regulation		±5 mV typical
Total regulation		±3.0% Vo
Minimum load		0 A
Ripple and noise 20 MHz bandwidth	Suffix 'W': Vo 2.5 V Vo > 2.5 V Suffix'L': Vo 1.0 V Vo > 1.0 V	25 mV pk-pk 1% Vo 20 mV pk-pk 30 mV pk-pk
Temperature co-efficient	-40 °C to +85 °C	±0.5% Vo
Transient response	(See Note 5)	70 µs recovery time Overshoot/undershoot 100 mV
Margin adjustment		±5.0% Vo

All specifications are typical at nominal input, full load at 25 °C unless otherwise stated.
Cin = 100 µF, Cout = 0 µF.

GENERAL SPECIFICATIONS

Efficiency		See Efficiency Table
Insulation voltage		Non-isolated
Switching frequency	Over Vin and Io ranges	Suffix 'W': 320 kHz typical Suffix 'L': 250 kHz typical
Approvals and standards		EN60950, UL/cUL60950
Material flammability		UL94V-0
Dimensions	L x W x H	22.10 x 12.57 x 8.50 mm 0.870 x 0.495 x 0.335 in
Weight		2.9 g (0.10 oz)
MTBF	Telcordia SR-332	7,092,000 hours

EMC CHARACTERISTICS

Electrostatic discharge	EN61000-4-2, IEC801-2
Conducted immunity	EN61000-4-6
Radiated immunity	EN61000-4-3

ENVIRONMENTAL SPECIFICATIONS

Thermal performance (See Note 2)	Operating ambient temperature Non-operating temperature	-40 °C to +85 °C -40 °C to +125 °C
MSL ('Z' suffix only)	JEDEC J-STD-020C	Level 3
Protection		
Short-circuit	Auto reset	14 A typical

ORDERING INFORMATION

Model Number[9]	Output Power (Max.)	Input Voltage	Output Voltage	Output Current (Min.)	Output Current (Max.)	Efficiency (Typical)	Regulation	
							Line	Load
PTH12050L	33 W	10.8 - 13.2 Vdc	0.8 - 1.8 Vdc	0 A	6 A	88%	±5 mV	±5 mV
PTH12050W	33 W	10.8 - 13.2 Vdc	1.2 - 5.5 Vdc	0 A	6 A	93%	±5 mV	±5 mV

PART NUMBER SYSTEM WITH OPTIONS

Product Family	Input Voltage	Output Current	Mechanical Package	Output Voltage Code	Pin Option[8]	Mounting Options	Pin Option
PTH	**12**	**05**	**0**	**W**	**A**	**S**	**T**
Point-of-Load Alliance compatible	12 = 12 V	05 = 6 A	Always 0	W = Wide L = Low Voltage		D = Horizontal through-hole (RoHS 6/6) Z = Surface-mount solder ball (RoHS 6/6)	No Suffix = Trays T = Tape and Reel[8]

OUTPUT VOLTAGE ADJUSTMENT

The ultra-wide output voltage trim range offers major advantages to users who select the PTH12050. It is no longer necessary to purchase a variety of modules in order to cover different output voltages. The output voltage can be trimmed in a range of 1.2 Vdc to 5.5 Vdc for suffix 'W' and 0.8 Vdc to 1.8 Vdc for suffix 'L'. When the PTH12050 converter leaves the factory the output has been adjusted to the default voltage of 1.2 V for the PTH12050W and 0.8 V for the PTH12050L.

Efficiency Table: PTH12050W (Io = 5 A)	
Output Voltage	Efficiency
Vo = 5.0 V	93%
Vo = 3.3 V	91%
Vo = 2.5 V	89%
Vo = 2.0 V	88%
Vo = 1.8 V	87%
Vo = 1.5 V	86%
Vo = 1.2 V	84%
Efficiency Table: PTH12050L (Io = 5 A)	
Output Voltage	Efficiency
Vo = 1.8 V	88%
Vo = 1.5 V	87%
Vo = 1.2 V	85%
Vo = 1.0 V	83%
Vo = 0.8 V	81%

Notes:
1. Remote ON/OFF. Positive Logic
   ON: Pin 3 open; or V > Vin - 0.5 V
   OFF: Pin 3 GND; or V < 0.8 V (min - 0.2 V).
2. See Figure 1 for safe operating curve.
3. A 100 µF electrolytic input capacitor is required for proper operation. The capacitor must be rated for a minimum of 750 mA rms of ripple current. C2 = 10 µF ceramic capacitor, required for output voltages of 3.3 V and higher.
4. An external output capacitor is not required for basic operation. Adding 100 µF of distributed capacitance at the load will improve the transient response.
5. 1 A/µs load step, 50 to 100% Iomax, Cout = 100 µF.
6. If utilized Vout will track applied voltage by ±0.3 V (up to Vo set point).
7. Tape and reel packaging only available on the surface-mount versions.
8. The pk-pk output ripple voltage is measured with an external 10 µF ceramic capacitor. See Figure 3 for Standard application schematic.
9. NOTICE: Some models do not support all options. Please contact your local Artesyn representative or use the on-line model number search tool at http://www.artesyn.com to find a suitable alternative.

CHARACTERISTIC DATA

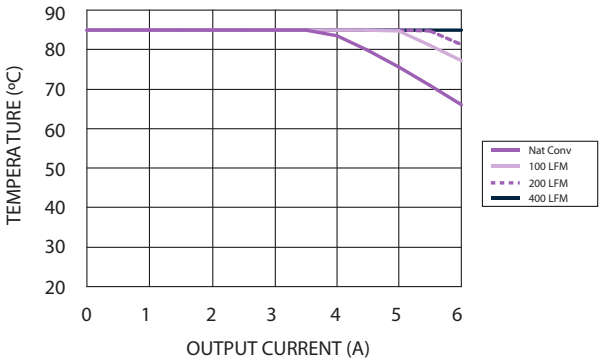


Figure 1 - Safe Operating Area for PTH12050W
Vin = 12 V, Output Voltage = 3.3 V (See Note A)

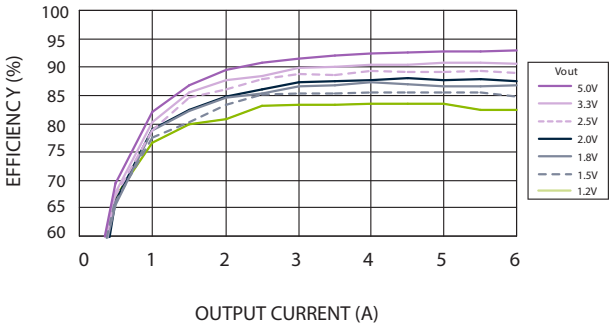


Figure 2 - Efficiency vs Load Current for PTH12050W
Vin = 12 V (See Note B)

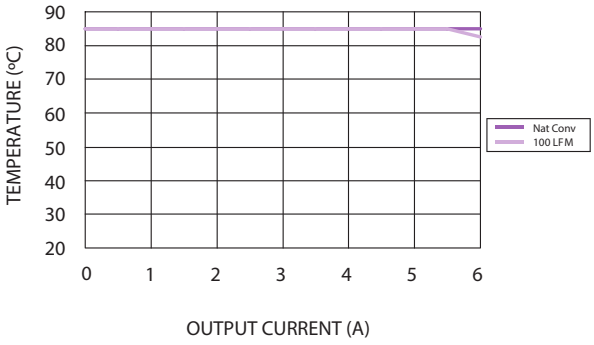


Figure 3 - Safe Operating Area for PTH12050L
Vin = 12 V, Output Voltage = 1.8 V (See Note A)

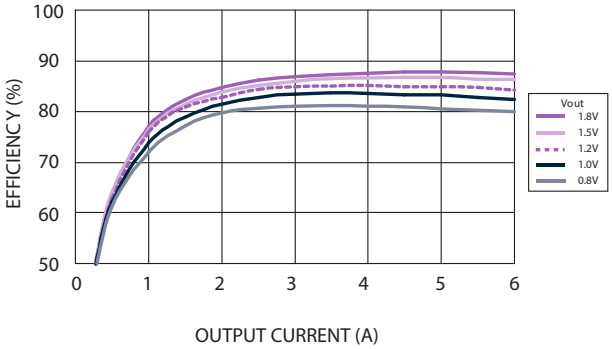


Figure 4 - Efficiency vs Load Current for PTH12050L
Vin = 12 V (See Note B)

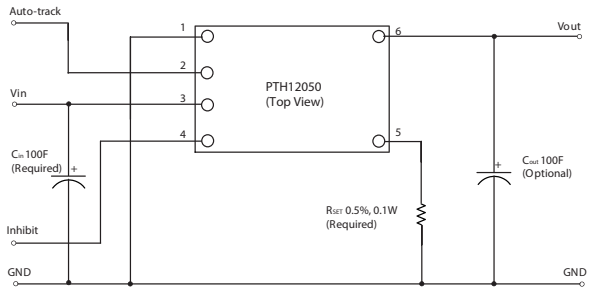
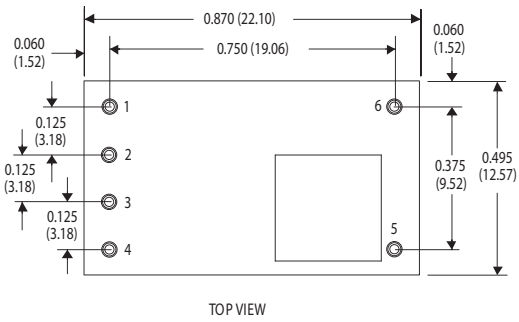


Figure 5 - Standard Application - All Models

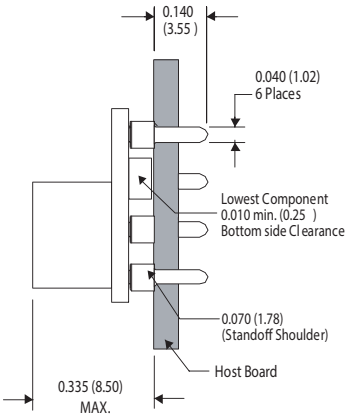
Notes:
A. SOA curves represent the conditions at which internal components are within the Artesyn derating guidelines.
B. Characteristic data has been developed from actual products tested at 25 °C. This data is considered typical data for the converter.

MECHANICAL DRAWINGS

Plated through-hole



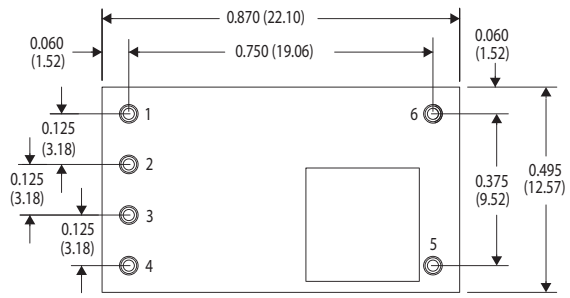
TOP VIEW



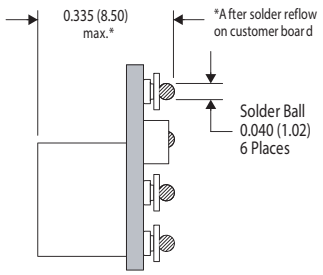
SIDE VIEW

Dimensions in Inches (mm)
Tolerances (unless otherwise specified)
2 Places 0.030 (0.76)
3 Places 0.010 (0.25)

Surface-mount



TOP VIEW



SIDE VIEW

Dimensions in Inches (mm)
Tolerances (unless otherwise specified)
2 Places 0.030 (0.76)
3 Places 0.010 (0.25)

Pin Assignments	
Pin	Function
1	Ground
2	Track
3	Vin
4	Inhibit*
5	Vo adjust
6	Vout
*Denotes negative logic: Open = Normal operation Ground = Function active	

ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

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